Ch 6 (Extra)
Sum and Product of Roots;
Writing Equations when given the roots

Given the solution set, write the equation.

ex 1:
{-5, 3}

sum = -2
prod = -15

$x^2 + 2x - 15 = 0$

$(x+5)(x-3) = 0$

ex 2:
{4, 6}

sum = 10
prod = 24

$x^2 - 10x + 24 = 0$

$(x-4)(x-6) = 0$

$x^2 - (\text{sum of roots})x + \text{product} = 0$

Given the solution set, write the equation.

ex 3:
{-.5, 4}

sum = $3\frac{1}{2}$

product = -2

$2(x^2 - 3\frac{1}{2}x - 2 = 0)$

$2x^2 - 7x - 4 = 0$

(No fractions/decimals)

Write the equation given the roots:

ex 4:

$\{-\frac{1}{2}, \frac{3}{4}\}$

$8\left(x^2 - \frac{1}{4}x - \frac{3}{8} = 0\right)$

sum = $\frac{1}{4}$

product = $-\frac{3}{8}$

$8x^2 - 2x - 3 = 0$

Write the equation given the roots:

ex 5:

$\left\{\frac{2 \pm i}{3}\right\}$

$9\left[x^2 - \frac{4}{3}x + \frac{5}{9} = 0\right]$

$\frac{2+i}{3}, \frac{2-i}{3}$

$9x^2 - 12x + 5 = 0$

sum = $\frac{4}{3}$ $2+i+2-i$

prod $\frac{(2+i)(2-i)}{4-i^2} = \frac{5}{9}$

Create a common denominator or:

$ax^2 + bx + c = 0$ (Factor out a)

$a\left(x^2 + \frac{b}{a}x + \frac{c}{a}\right) = 0$

$a(x^2 - (\text{sum})x + \text{product}) = 0$

prod = $\frac{c}{a}$

sum = $-\frac{b}{a}$

sum = $\frac{-b}{a}$

product = $\frac{c}{a}$

Find k such that
$4x^2 + kx - 15 = 0$
has a root of $\frac{3}{4}$

$\frac{3}{4}, r$

$\frac{3}{4} + r = \frac{-k}{4}$

$\frac{3}{4} \cdot r = \frac{-15}{4}$

$r = -5$

$\frac{3}{4} - \frac{20}{4} = \frac{-k}{4}$

$\frac{-17}{4} = \frac{-k}{4}$

$17 = k$

Find k such that
$x^2 - 2x + k = 0$ has
a root of $1 - \sqrt{7}$

9-19odd
16, 20

$1 - \sqrt{7} + r = 2$

$r = +1 + \sqrt{7}$

$(1 - \sqrt{7})(+1 + \sqrt{7}) = k$ (c/a)

$+1 - 7$

$-6 = k$

Also a good check.
Solve.
$x^2 + 5x - 24 = 0$

HW
worksheet #s 9-19odd, 16, 20